EFFECTIVENESS OF VALSALVA MANEUVER ON PAIN REDUCTION AMONG ADULT PATIENTS UNDERGOING PERIPHERAL INTRAVENOUS CANNULATION IN SREE MOOKAMBIKA MEDICAL COLLEGE HOSPITAL, KULASEKHARAM

A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY CHENNAI, IN PARTIAL FULFILMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

APRIL-2015

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Internal Examiner External Examiner

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BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled **"A study to assess the effectiveness of valsalva maneuver on pain reduction among adult patients undergoing peripheral intravenous cannulation in Sree Mookambika Medical College Hospital, Kulasekharam"** is a bonafide research work done by **Mrs. Anjana,T.D** II year MSc (N), Sree Mookambika College of Nursing, Kulasekharam under the guidance of **Mrs. Ajitha Rethinam M.Sc (N), MBA** Professor, Medical Surgical Nursing in partial fulfilment of the requirements for the Degree of Master of Science in Nursing under Tamilnadu Dr. M.G.R Medical University.

Principal

Place : Kulasekharam
Date : 9-02-2015

Sree Mookambika College of Nursing,
Kulasekharam.

DECLARATION

I hereby declare that the present dissertation titled **"A study to assess the effectiveness of valsalva maneuver on pain reduction among adult patients undergoing peripheral intravenous cannulation in Sree Mookambika Medical College Hospital, Kulasekharam"** is the outcome of the original research undertaken and carried out by me under the guidance of **Mrs. Ajitha Rethinam M.Sc (N), MBA** Professor, Medical Surgical Nursing, Sree Mookambika College of Nursing, Kulasekharam. I also declare that the material of this has not formed in anyway, the basis for the award of any degree or diploma in this university or any universities.

Place: Kulasekharam **Anjana,T.D**

Date : 9-2-2015 II year MSc (N)

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Investigator

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ABSTRACT

Introduction:

Procedure pain is an important source of discomfort for clients in healthcare setting. Intravenous cannulation is the common procedure that nurses frequently carry out which cause pain and distress to the recipient. The anticipation of pain about intravenous cannulation is generally under estimated and unappreciated. Past experience of intravenous cannulation may lead to avoidance or postponed needed medical care. Valsalva Maneuver is a non-pharmacological and cost effective method to reduce pain during intravenous cannulation. The study was undertaken to asses the effect of Valsalva Maneuver on pain reduction amoung adult patient undergoing intravenous cannulation in Sree Mookambika Medical College Hospital, Kulasekharam.

Study Objective:

1. To assess the effect of Valsalva Maneuver on reducing pain during intravenous cannulation by comparing with control group.

Research Methodology:

The researcher adopted a quasi-experimental with post test only control group design. Patients admitted in Sree Mookambika Medical college hospital who needs peripheral intravenous cannulation were selected based on inclusion and exclusion criteria using purposive sampling technique. Thirty samples were allotted to experimental group and thirty allotted to the control group. Valsalva Maneuver is performed in experimental group prior to peripheral intravenous cannulation. Whereas control group was not given any intervention. Post test was conducted in experimental and control group using numerical rating pain scale.

The date collected were analyzed based on the above mentioned objectives using the descriptive and inferential statics.

Study Findings:

The study found that there was a significant reduction in the level of pain during peripheral intravenous cannulation in experimental group than in the control group. The t-value difference of comparison of post-test pain tabulated was found to be $t = 14.8^{*}$, $df = 58$, $p < 0.05$.

Conclusion:

The study findings indicate that the Valsalva Maneuver is effective non pharmacological measure to reduce pain during peripheral intravenous cannulation.

Chapter i

INTRODUCTION

"**Satisfaction consist of freedom from pain which is the positive element of life**"

(Arthur Schopenhauer)

Procedural pain is an important source of discomfort for clients in health care setting. Intravenous cannulation is the common procedure that nurses frequently carry out which causes pain and distress to the recipient. "Failure to treat pain is in humane and constitutes professional negligence". Providing pain relief is consider as a basic human right and is in corporate in to the pain care bill of rights (Mein hart and MC. Caffery,1979).

Intravenous cannulation become an important component of patient care. It is estimated that 80% of all patients who enter in to the health service each year receives intravenous infusions and injections. Inserting an intravenous cannula is aimed to provide quick and efficient access in emergency (Dr. Savarimuthammal M.S , A. Purnugla. Aier, 2008).

Insertion of intravenous cannula is often complicated in patients who are afraid of needs or have had experiences. The anticipation of pain about intravenous cannulation is generally under estimated and unappreciated. It is strange that evidence based practice to be un usual towards practice like intravenous cannulation (Singhal V ,2006).

During intravenous cannulation the patients may experience moderate to severe pain. Nurses care for clients in many settings and situations in which interventions are provided to promote comfort. A variety of nursing comforts are basic to client need for which nursing care is delivered. The content of comfort is the umbrella under which pain and pain management options are received . Comfort is a concept central to the art of nursing. Through comfort and comfort measures nurses provide strength, hope, solace, support, encouragement and assistance(Donabue, 1989).

Valsalva maneuver is one of the non pharmacological method, that can be used to reduce pain during intravenous cannulation (Vijay VR,2013).

Background of the Study

The exposure to noxious stimuli like pain results in the release of neuro transmitters which may surround pain fibers, causing inflammatory responses. The pain fibers enter the spinal cord and travels one of several routes until ending with in the gray matter of the spinal cord. There by transmitting the pain. Nerve impulses resulting from painful stimulus travels along afferent and efferent peripheral nerve fibers (Wall and Melzack, 1999).

Most clients are some what fearful of intravenous cannulation pain. The extant to which a clients fears about intravenous cannulation is depends upon their personality, gender, culture etc. Past experience of intravenous cannulation may leads to avoidance or postpone needed medical care (Kauffman RE, 2008).

Valsalva maneuver is an effective way to reduce the pain during intravenous cannulation. It is one of the non pharmacological and cost effective method to reduce intravenous cannulation pain (Meenakshi Agnihotri , 2013).

Basaranoglu (2006) conducted a prospective randomized clinical trial to evaluate the effect of valsalva maneuver which stimulate vagus nerve on perception of pain during peripheral intravenous cannulation in adult patients. 110 adult patients were selected for the study and he found out that the valsalva maneuver may be of value before venous cannulation as a simple and practical method to reduce pain from venous cannulation (Basaranoglu G, 2006).

Need and Significance of the Study

The intravenous cannulation pain is one of the major cause for medical care negligence. According to Hamilton Medical Journal about 10% of the population to an extant have needle phobia especially intravenous cannulation, which causes them to avoid or postpone needed medical care. The world's leading cause for un countable death is due to needle phobia. The needle phobia can leads to vasovagal reactions such as initial rise in blood pressure followed by steep drop in blood pressure that may leads to loss of consciousness and some times convulsions (Agarwal A , 2005).

Approximately five million intravenous cannulations are done per year in India , and of these 3-8% leads to severe infections and all the patients may experience severe pain during intravenous cannulation (Amit Kumar Singhal, 2005).

Couceiro (2003) conducted a randomized prospective study to evaluate the pain during intravenous cannulation. The results showed that 77.4% of persons have severe pain due to intravenous cannulation and 12.9% persons have moderate to mild pain due to intravenous cannulation (Couceiro, 2003).

In the modern era, as the science and technology have been impoverished for the sake of comfort of the people, it is very much necessary to control even the mild pain that causes discomfort to the people (Kyle, 2008).

Valsalva maneuver is one of the non pharmacological methods that can be used to reduce pain. This technique is named for Antonio Maria Valsalva, the 17th century physician and anatomist. The valsalva maneuver is performed by moderately forceful attempted exhalation against a closed airway. The valsalva maneuver is useful to reduce pain during intravenous cannulation (Vijay VR, 2013).

Statement of the Problem

"A study to assess the effectiveness of valsalva Maneuver on pain reduction among adult patients undergoing peripheral intravenous cannulation in Sree Mookambika Medical College Hospital, Kulasekharam"

Objectives of the Study

1. To assess the effect of valsalva maneuver on reducing pain during peripheral intravenous cannulation by comparing with control group.
2. To find out the association between level of pain and selected demographic variables like age, sex, education, occupation, culture and previous experience of intravenous cannulation.

Hypothesis

1. There is a significant reduction in the level of pain during peripheral intravenous cannulation in the experimental group than in the control group.

2. There is a significant association between the level of pain with selected demographic variables such as age, sex, education, occupation, culture and previous experience of intravenous cannulation.

Operational Definitions

1. **Effectiveness:**

   In this study, effectiveness refers to reduction of pain during peripheral intravenous cannulation with the use of valsalva maneuver as measured by numerical rating pain scale.

2. **Pain:**

   In this study, pain refers to discomfort or unpleasant sensation caused by peripheral intravenous cannulation assessed by numerical rating scale.

3. **Valsalva maneuver:**

   In this study, valsalva maneuver refers to the maneuveric blowing forcefully in to the rubber-tubing connected to aneroid BP apparatus and raising the needle of the dial up to 20 mmHg for a period of 20 seconds prior to peripheral intravenous cannulation.

4. **Peripheral Intravenous cannulation*:***

   In this study peripheral intravenous cannulation refers to insertion of a 20G intravenous cannula in to the peripheral vein.

Variables

1. **Independent Variable**

   Valsalva Maneuver.

2. **Dependent Variable**

   Pain during peripheral intravenous cannulation.

3. **Demographic variables**

Age, sex, education, occupation, culture and previous experience of intravenous cannulation.

Assumption

The study assumes that

1. Peripheral intravenous cannulation may cause pain.

2. Blowing forcefully in to a rubber tubing connected to aneroid BP apparatus and raising the needle of the dial up to 20 mm Hg for a period of 20seconds may reduce pain during peripheral intravenous cannulation.

Delimitation

The study is delimited to

1. The adult patients in the age group of 25-45 years who are having peripheral intravenous cannualtion admitted in Sree Mookambika Medical College Hospital, Kulasekharam.
2. Patients who are willing to participate in the study.

Ethical consideration

The study was conducted after getting approval from research and ethical clearance committee of Sree Mookambika Medical College and written consent from director of Sree Mookambika Institute of Medical Sciences. Oral consent was obtained from each sample before the intervention. Assurance was given to the samples and privacy was maintained.

Conceptual frame work

The conceptual frame work helps to make the research findings meaningful and generalizable. It allows the researcher to knit together the observation and facts in an orderly scheme.

The conceptual frame work adopted for the present study is based on Lydia .E. Halls Core, Care and Cure theory model (1994). She considered a basic philosophy of nursing up on which the nurse may base patient care. As a nurse theorist, Lydia .E. Hall is unique in that her beliefs in nursing were demonstrated in practice. Hall presented her theory of nursing visually by drawing three inter locking circles i.e., core, care and cure. The three aspects are interrelated and influenced by each other. Nursing has major role in these three aspects.

Core Circle

Core circle of patient care is based on the concept that patient looks at and explores feelings regarding his or her current health status and potential changes i.e., core circle deals with patient's problems. In the present study core part deals with pain during peripheral intravenous cannulation experienced by adults in the age group of 25 to 45 years.

Care Circle

Care circle represents the nurturing component i.e. the concept of potential comforter (care and comfort of patients) and provide for teaching learning activities. In this study care circle includes the demonstration of Valsalva Maneuver and practicing of Valsalva Maneuver by the adult patients prior to peripheral intravenous cannulation and post test assessment of level of pain using numerical rating scale.

Cure Circle

Cure circle of patient care is the evaluation of the pathological and therapeutic science applied by the health team members. In this study, cure part deals with response of the care provided for the study subject by researcher i.e., reduction in the level of pain during peripheral intravenous cannulation.

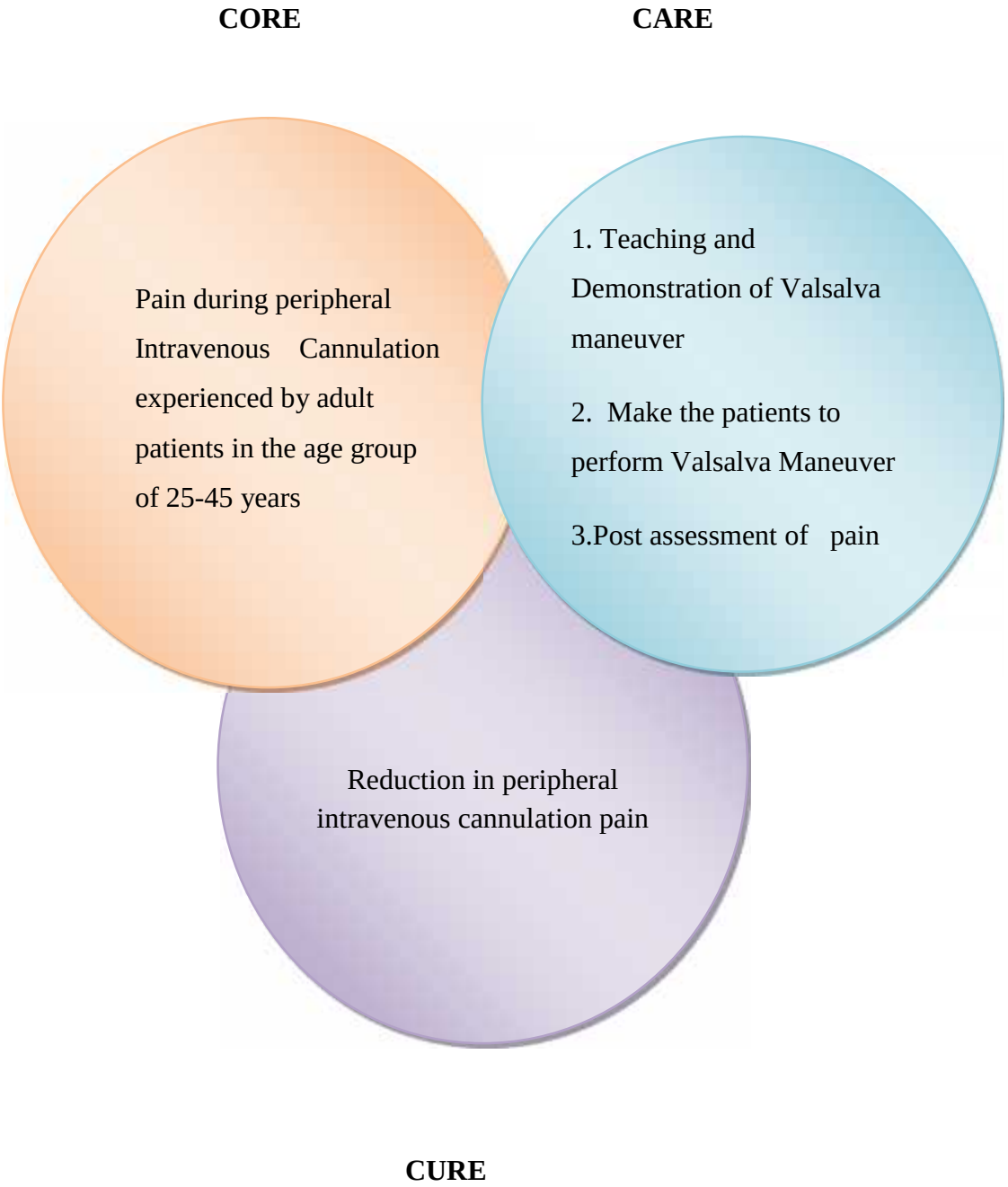


Figure 1. Conceptual Frame Work Lydia. E. Hall's Core,Care,Cure Model

Chapter ii

REVIEW OF LITERATURE

Review of literature is a key step in research process. It is an account of what is already known about a particular phenomenon. The main purpose of the literature review is to convey to the readers about the work already done and the knowledge and ideas that have been already established on a particular topic of research. It refers to an extensive, exhaustive and systemic examination of publication relevant to the research project.

A literature review is an evaluation report of information found in the literature related to selected area of study. The review describes, summaries, evaluate and clarifies the literature. It gives a theoretical base for the research and helps to determine the nature of research(Queensland University 1998). Research literature was reviewed and organized under the following headings.

1. Studies related to incidence and prevalence of peripheral intravenous cannulation.
2. Studies related to effectiveness of valsalva maneuver on pain reduction during peripheral intravenous cannulation.
3. Studies related to valsalva maneuver.

Studies related to Incidence and Prevalence of Peripheral Intravenous Cannulation

Jagadamba A.K. Kutty et al(2010) conducted a study on the gender variation in pain perception after intravenous cannulation in adults.100 subjects, were selected after ethical clearance. Informed consent was taken. Immediately after the intravenous cannulation using 20 gauge intravenous cannula the subjective pain was assessed by using Visual Analogue pain scale (VAS) on 0 (No pain) – 10 (Max pain). Results thus obtained were analyzed by Pearson Chi Square test(X^2).Pain perception was moderate to severe (5-10) in 64% of females as compared to 12% in males. There was significant increase in pain perception in females compared to males ($X^2 = 31.84$, $p<.001$).

Jane Munnings et al (2010) conducted an observational and self report survey analysis on clinical implication of un managed needle insertion pain was conducted among children and adolescents undergoing routine venipuncture. Samples of 171 children's ranging from 3 to 17 yrs were included in the study. Visual analogue scale was used to assess the pain. 36% of children at the age of 3 to 6 years and 13% of children 7 to 17 years of age reported moderate to severe pain.

Couceiro TC et al (2003) conducted a randomized prospective study to evaluate pain during intravenous cannulation. Samples of 300 patients undergoing intravenous cannulation were selected. Out of 300 samples, 150 samples were administered local analgesics prior to cannulation. Again each of the 150 group was further allocated to one of the five cannula size group 20, 18, 17, 16, 14. The samples were asked to quantify the pain using a four point scale. The result showed that the incidence of pain for 14G, 16G were 77.4% and 45.1% as compared to 10% and 12.9% with local anaesthetics. The rest of the 18G, 20G, and 17G without analgesics had more pain as compared with those who applied local anaesthetic agent.

Ruchi Saini et al (2011) conducted a study at Nehru Hospital, Post Graduate Institute of Medical Education and Research(PGIMER), Chandigarh to evaluate various complications of intravenous cannulation. Total 168 peripheral intravenous cannulae were included in the study using purposive sampling technique and were studied prospectively for the after effect of the intravenous therapy. The study revealed incidence of inflammation and phlebitis as 31.5% and 29.8% respectively.

Studies Related to Effectiveness of Valsalva Maneuver on Pain Reduction during Peripheral Intravenous Cannulation:

Basaranoglu et al(2006) conducted a prospective clinical trial to evaluate the effect of valsalva maneuver, which stimulates vagus nerve on perception of pain during peripheral venous cannulation in adult patients. One hundred and ten patients scheduled for elective surgery were randomly divided into two groups. Half of the patients, Group A, underwent venepuncture during a Valsalva maneuver and the other half of the patients, Group B, underwent venepuncture without performing a Valsalva maneuver. Patients made a pain assessment using a 0-10 point numerical rating scale.

The numerical rating scale score was 1.5+/-1.2 for Group A and 3.1+/-1.9 for Group B, the difference being statistically significant (P<0.0001). On the basis of data from this study, the Valsalva maneuver before venous cannulation as a simple and practical method to reduce pain from venous cannulation.

Roslin Francis(2010) conducted a study to assess the effectiveness of the valsalva maneuver on pain associated with cannulation. A group of seventy five adults undergoing elective surgery, were selected. Patients were randomized into 3 groups of 25 each. Group I (C): control; Group II (V): blew into sphygmomanometer tubing and raised the mercury column up to 30 mm Hg for 20 s; Group III (B): pressed a rubber ball. Venous cannulation pain was graded using a 4 point scale. A significant reduction in the pain was observed in the Valsalva group: 18 of 25 (72%) patients, whereas 25 of 25 (100%) experienced pain in the other two groups (P < 0.001). On the basis of data from this study, the Valsalva maneuver before venous cannulation as a simple and practical method to reduce pain from venous cannulation.

Suren M et al (2012) conducted a study to compare the analgesic efficacy of eutectic mixture of local anesthetic (EMLA(®) with that of valsalva maneuver in adult patient during intravenous cannulation. One hundred ninety-five patients were randomized prospectively to three groups. The dorsum of the nondominant hand was covered with a thick paste of 2.5 g of EMLA(®) cream in the EMLA(®) group (group E) and left for a minimum of 30 min before venipuncture. In the control group (group C), the same procedure was applied except that Vaseline(®) was used instead of the EMLA(®). The Valsalva group (group V) were punctured during a Valsalva maneuver. The patients were placed in the supine position during venipuncture. The patients then scored the amount of pain on cannulation using an 11-point numerical rating scale (NRS; 0 = no pain, 10 = extreme pain). Thirteen patients were excluded from the analysis due to failed cannulation. There was no difference in the demographic profiles of the groups (p > 0.05). The success of Valsalva maneuver was significantly higher in group V than in groups E and C (p < 0.001). The median pain score as assessed by the NRS after venipuncture in group C was 3 (range 0-9), whereas the median pain values in groups E and V were 2 (range 0-7) and 2 (range 1-8). The Valsalva maneuver yields similar results to the EMLA(®) in terms of pain reduction during venipuncture. Valsalva maneuver is an effective method to reduce pain during intravenous cannulation.

Agarwal A et al (2005) conducted a prospective randomized study to evaluate the efficacy of the valsalva maneuver on venous cannulation pain. Seventy-five adults, ASA physical status I and II, either sex, undergoing elective surgery, were included in the study. Patients were randomized into 3 groups of 25 each. Group I (C): control; Group II (V): blew into sphygmomanometer tubing and raised the mercury column up to 30 mm Hg for 20 s; Group III (B): pressed a rubber ball. Twenty seconds later, peripheral venous cannulation was performed. Venous cannulation pain was graded using a 4-point scale: 0-3, where 0 = no pain, 1 = mild pain, 2 = moderate pain, and 3 = severe pain, and visual analog scale of 0-10, where 0 = no pain and 10 = worst imaginable pain. A significant reduction in the incidence of pain was observed in the Valsalva group: 18 of 25 (72%) patients, whereas 25 of 25 (100%) experienced pain in the other two groups ($P < 0.001$). A significant reduction in the severity of pain, number of patients in whom one needed to make the vein prominent before cannulation, and the time taken for the same were observed in the Valsalva group ($P < 0.001$). Valsalva maneuver is an effective method to reduce pain during intravenous cannulation.

Rahimi M (2012) conducted a prospective randomized clinical trial in Turkey on effect of valsalva maneuver on venipuncture pain. One hundred and ten patients scheduled for elective surgery were randomly divided into two groups. Half of the patients, Group A, underwent venepuncture during a Valsalva maneuver and the other half of the patients, Group B, underwent venepuncture without performing a Valsalva maneuver. Pain assessment was done using a 0-10 point numerical rating scale. The numerical rating scale score was 1.5+/-1.2 for Group A and 3.1+/-1.9 for Group B, the difference being statistically significant ($P<0.0001$). It was concluded that the valsalva maneuver as a simple and practical method to reduce pain from venous cannulation.

Mohammadi SS et al (2011) conducted a study to assess the effect of valsalva maneuver on intravenous cannulation pain that can induce baroreceptor activation and nociception . Ninety adults, ASA physical status I and II undergoing elective surgeries were included. Patients were randomized into three equal groups. Group I (C): control; Group II (B): ball; pressed a rubber ball (attention-diverting method); Group III (V): valsalva; blew into sphygmomanometer tubing and hold the mercury column up to 30 mm Hg for a period of at least 20s. Pain was graded using numeric

rating scale (NRS): 1-10, where scales of 1-3 were rated as mild, 4-6 as moderate, and >6 as severe . Significant reduction in NRS was observed in the valsalva group compared with the control and the ball groups (p=0.001).

Vijay VR et al (2013) conducted a quasi experimental research to identify the effect of valsalva maneuver on pain reduction during intravenous cannulation. One hundred subject who required peripheral intravenous cannulation for chemotherapy were included in the study. Subject were randomly allocated into control(50) and experimental group (50) using lottery method. In control group type 1 protocol (cannulation with out performing valsalva maneuver) was applied. Where as in interventional group type 2 protocol (performing valsalva maneuver before cannulation) was applied. Interview schedule was used to collect socio-demographic data and clinical data of the subjects. Pain during cannulation was assessed immediately after performing cannulation by using numerical rating scale (NRS) in both groups. Mean NRS score was significantly less in interventional group than control group ($t = 5.31$, $p<0.01$). In control group 64% of subjects experienced moderate pain where in the interventional group 66% had mild pain. 10% 0f subjects from control group had severe pain. Where as only 2% of cannulation had severe pain in the interventional group ($x^2 = 16.69$, $p< 0.01$). There was no difference between the sites of cannulation and number of previous cannulation on mean pain score. In conclusions valsalva maneuver decreased the intensity of pain associated with peripheral venous cannulation.

H.Ozdemir et al (2013) conducted a study to evaluate effect of Valsalva Maneuver on venipuncture pain as compared with Eutectic Mixture of Local Anesthetic (EMLA(®)) cream in children. sixty childrens scheduled for elective surgery were randomly divided into three groups. In Group V, children were punctured during ValsalvaManeuver. In Group E, EMLA(®) 5 % cream and in Group C (control group) vaseline was applied on the non-dominant hand 60 min before the venipuncture. Patients made a pain assessment using visual analog score (VAS). Mean arterial pressure (MAP), heart rate (HR), and SpO2 measurements were obtained during the venous cannulation.Respectively, the VAS was 2.15 ± 1.95 for Group V and 1.00 ± 0.79 for Group E and 2.55 ± 2.74 for Group C. A significant reduction in the severity of pain was observed in Group E. The difference being statistically significant ($p < 0.05$), the VAS of Group V was higher than Group E but

lower than Group C (p > 0.05).On the basis of data from this study, the ValsalvaManeuver is a simple and a practical method to reduce venipuncture pain in children but not as effectively as EMLA(®).

Devendra Gupta et al (2013) conducted a study to evaluate the effect of valsalva maneuver with other pharmacological measures.One hundred twenty patients were randomized into 4 equal groups. The control group received plain lubricant cream; the EMLA group received EMLA cream; the capsaicin group received Myolaxin ointment (containing oleoresin capsaicin equivalent to capsaicin 0.075% w/w, methylsalicylate IP 20% w/w, menthol IP 10% w/w, camphor USP 5% w/w, and eucalyptus oil IP 5% w/w); and the Valsalva group during Valsalva Maneuver. An anesthesiologist applied the cream to a 10-cm(2) area (site of venous cannulation) on the dorsum of the nondominant hand of the patient 1 hour before venipuncture and covered the area with an occlusive transparent dressing in control group, EMLA group, capsaicin group and in the Valsalva group venipuncture was performed during Valsalva Maneuver. Venipuncture was performed with an 18-gauge cannula after removing the dressing in other groups and during Valsalva Maneuver in Valsalva group. Venipuncture pain was graded by the patient on a 0 to 10 visual analog scale, where 0 means no pain and 10 means worst imaginable pain. P values (after correction for multiple comparisons) of <0.05 were consideredsignificant. The incidence of no pain on venous cannulation (primary end point) was 0% in the control group (0/30). The incidence of no pain were significantly higher in the EMLA group (32%, 9/28, 95% corrected confidence interval for the difference 12%-57%, P = 0.0025), capsaicin group (30%, 9/30, 10%-53%, P = 0.0031), and Valsalva groups (47%, 14/30, 25%-69%, P < 0.0001). Severity of venipuncture pain as assessed by visual analog scale median (interquartile range) was lower in the Valsalva group compared with other groups control, EMLA, and capsaicin, respectively (P < 0.001, P = 0.04, and P = 0.04, respectively).The study shows that the Valsalva Maneuver is effective in managing venous cannulation pain.

Ziya Kaya et al (2013) conducted a study in Turky to compare the analgesic efficacy of eutectic mixture of local anesthetic (EMLA(®) with that of valsalva maneuver in adult patient during intravenous cannulation. One hundred ninety-five patients were randomized prospectively to three groups. The dorsum of the

nondominant hand was covered with a thick paste of 2.5 g of EMLA(®) cream in the EMLA(®) group (group E) and left for a minimum of 30 min before venipuncture. In the control group (group C), the same procedure was applied except that Vaseline(®) was used instead of the EMLA(®). The Valsalva group (group V) were punctured during a Valsalva maneuver. The patients were placed in the supine position during venipuncture. The patients then scored the amount of pain on cannulation using an 11-point numerical rating scale (NRS; 0 = no pain, 10 = extreme pain). Thirteen patients were excluded from the analysis due to failed cannulation. There was no difference in the demographic profiles of the groups ($p > 0.05$). The success of Valsalva maneuver was significantly higher in group V than in groups E and C ($p < 0.001$). The median pain score as assessed by the NRS after venipuncture in group C was 3 (range 0-9), whereas the median pain values in groups E and V were 2 (range 0-7) and 2 (range 1-8). The Valsalva maneuver yields similar results to the EMLA(®) in terms of pain reduction during venipuncture. Valsalva maneuver is an effective method to reduce pain during intravenous cannulation.

Serkan Karaman et al (2012) was conducted a study to asses the effect of valsalva maneuver on pain reduction during intravenous cannulation in different hospital in Lucknow.One hundred ninety patients were randomized prospectively to two groups. The dorsum of the nondominant hand was covered with a thick paste of Vaselin in the control group (group c) before venipuncture. The Valsalva group (group V) were punctured during a Valsalva maneuver. The patients were placed in the supine position during venipuncture. The patients then scored the amount of pain on cannulation using an 10 cm numerical rating scale (NRS; 0 = no pain, 10 = extreme pain).Thirteen patients were excluded from the analysis due to failed cannulation. There was no difference in the demographic profiles of the groups ($p > 0.05$). The success of Valsalva Maneuver was significantly higher in group V than in groups C ($p < 0.001$). The median pain score as assessed by the NRS after venipuncture in group C was 3 (range 0-9), V were 2 (range 1-8).The Valsalva maneuver has good effect in pain reduction during venipuncture

Studies Related to Valsalva Maneuver:

Pajand A G et al (2011) conducted a study to evaluate the efficacy of the valsalva maneuver, on needle projection pain and hemodynamic responses associated with spinal puncture. Ninety adults, ASA physical status I and II undergoing elective surgeries were included. Patients were randomized into three equal groups. Group I (C): control; Group II (B): ball; pressed a rubber ball , Group III (V): valsalva; blew into sphygmomanometer tubing and hold the mercury column up to 30 mm Hg for a period of at least 20s. Spinal needle projection pain was graded using numeric rating scale (NRS): 1-10, where scales of 1-3 were rated as mild, 4-6 as moderate, and >6 as severe. Blood pressure and heart rate, five minutes before the procedure, during the spinal puncture and first and third minutes after that, were also recorded. Significant reduction in NRS was observed in the valsalva group compared with the control and the ball groups (p=0.001). There were statistical but no significant clinical differences in mean arterial blood pressure and heart rates between the study groups (P=0.008 and P=0.016 respectively). In conclusion valsalva maneuver can decrease the skin puncture pain associated with spinal needle projection while observing hemodynamic changes.

Smith GD et al(2013) conducted three randomized controlled trials to asses effectiveness of valsalva maneuver for reversion of supraventricular tachycardia . Three hundred and sixteen participants included in the study . All three studies compared the effectiveness of Valsalva maneuver(VM) in reverting Supraventricular tachycardia(SVT) with that of other vagal maneuvers in a cross-over design. Two studies induced SVT within a controlled laboratory environment. Participants had ceased all medications prior to engaging in these studies. The third study reported on patients presenting to a hospital emergency department with an episode of SVT. These patients were not controlled for medications or other factors prior to intervention. The two laboratory studies demonstrated reversion rates of 45.9% and 54.3%, whilst the clinical study demonstrated reversion success of 19.4%. This discrepancy may be due to methodological differences between studies, the effect of induced SVT versus spontaneous episodic SVT, and participant factors such as medications and co morbidities. The result shows that there were no sufficient evidence to support or refute the effectiveness of the Valsalva maneuver for termination of SVT.

Walker S et al (2010) conducted a prospective trial of the impact of the modified Valsalva maneuver on patients presenting in Supraventricular tachycardia (SVT) to the emergency department. After meeting the study criteria and giving consent, the patients were instructed to perform the modified Valsalva maneuver, that is, while lying supine on the bed in a Trendelenberg position, they forcefully expire into a section of suction tubing and pressure gauge for at least 15 s and at a pressure of at least 40 mmHg. Result showed that in 19 patients, 6 reverted with the modified Valsalva maneuver. The valsalva maneuver has an effect to revert SVT.

Appelboam A et al (2014) conducted a multicentre randomized controlled clinical trial in 10 UK emergency departments (EDs) to assess the effectiveness of modified valsalva maneuver in treating Reentrant tachycardia's (REVERT) .It compares a standard Valsalva maneuver (VM) with a modified Valsalva maneuver incorporating leg elevation and a supine posture after a standardized strain in stable adult patients presenting to the ED with SVT. The primary outcome measure is return to sinus rhythm on a 12-lead ECG. Secondary outcome measures include the need for treatment with adenosine or other antiarrhythmic treatments and the time patients spend in the ED. In 372 patients, with 80% power to demonstrate an absolute improvement in cardio version rate of 12%. An improvement of this magnitude through the use of a modified VM would be of significant benefit to patients and healthcare providers, and justify a change to standard practice.

Taylor DM et al (2004) conducted a multicentre, observational study to assess the doctors in emergency department instruct the patients to perform the recommended valsalva maneuver (VM) technique correctly. The participants includes of 35 ED registrars and 17 emergency physicians. Each doctor was asked to describe how he/she would instruct a patient in Supraventricular tachycardia (SVT) to perform the VM. Only five (9.6%) doctors position their patient correctly and 31 (59.6%) incorrectly instruct their patient to assume a sitting or semi recumbent position. Only five (9.6%) doctors gave specific instructions to blow for at least 15 s and 34 (65.4%) instructed their patients to blow 'as long as you can'. Only four (7.4%) doctors used a sphygmomanometer to measure intrathoracic pressure during the VM. There were no significant differences ($P > 0.05$) between the registrar and physician. The result showed that only few ED doctors correctly instruct their patients in the VM technique

recommended for management of SVT. Hence, maximal vagal tone and SVT conversion rates may not be achieved in many cases.

Lim S H et al (1998) conducted a prospective randomized case study to compare the efficacy of the Valsalva maneuver with that of carotid sinus massage (CSM) in terminating paroxysmal supraventricular tachycardia (SVT) in the Emergency department (ED) of a tertiary care institution. Patients were at least 10 years of age with regular narrow complex tachycardia and had an ECG diagnosis of SVT. Patients with regular narrow complex tachycardia were randomly assigned to undergo either the Valsalva maneuver or CSM. If the tachycardia was not terminated by the method chosen by randomization, then the alternative method of vagal maneuver was used. If the tachycardia was not converted by both methods of vagal stimulation, patients would undergo either synchronized electrical cardio version or a pharmacologic method of conversion at the discretion of the treating physician, depending on the patient's hemodynamic status. One hundred forty-eight instances of SVT were studied Sixty-two patients underwent Valsalva maneuver first with conversion in 12 (success rate of 19.4%). Eighty-six underwent CSM first with conversion in 9 (success rate 10.5%). Carotid sinus massage was used in the 50 cases of SVT in which conversion was not achieved with the Valsalva maneuver. Conversion occurred in 7 cases (success rate 14.0%). For the 77 cases of SVT in which initial CSM did not achieve conversion, conversion occurred in 13 with the Valsalva maneuver (success rate 16.9%). The Valsalva maneuver and CSM achieved conversion in a total of 41 instances of SVT (success rate 27.7%). There is no detectable difference in efficacy between the Valsalva maneuver and CSM.

Carl J Pepine et al (1979) conducted a study to assess the influence of the Valsalva maneuver (VM) on myocardial ischemia. 24patients with coronary heart disease selected for the study. Clinical and hemodynamic responses to the VM were studied during acute ischemia manifested by angina pectoris with transient left ventricular (LV) dysfunction and compared with responses during non ischemic intervals. In the absence of evidence for acute ischemia (angina and increased LV end-diastolic pressure), six patients had abnormal hemodynamic responses to the VM. Five had lack of systolic pressure overshoot and in one, systolic pressure did not decline during straining. When the VM was performed during an ischemic episode, 14 patients had abnormal responses (12 with lack of overshoot in phase IV and two with

lack of systolic pressure decline in phase II). In 18 patients a prompt decline in LV end-diastolic pressure occurred with the disappearance of angina during the VM. These changes uniformly occurred during the latter part of straining(VM phase II) as cardiac size and systolic pressure declined. No adverse effects occurred when a VM was performed during acute ischemia. Observations suggest that the VM abruptly reduces determinants of cardiac oxygen demand, relieving acute ischemia without harmful effects.

Arthur J Labovitz MD et al (1985) conducted a study to determine the effects of the Valsalva maneuver on global and regional left ventricular function. 50 patients were selected. Single-plane left ventriculograms were performed in the 30-degree right anterior oblique projection in 50 patients during normal breath holding and during the late strain phase of the Valsalva maneuver. Thirty-one patients had significant coronary artery disease (greater than 70% luminal narrowing in a major coronary artery). Ventriculograms were analyzed for determination of ejection fraction, end-diastolic, and end-systolic volumes. Regional wall motion was analyzed by a chord method of calculating segmental fractional shortening. Ejection fraction increased significantly in the entire group of patients (62 ± 16% to 70 ± 19%, $p < 0.0001$), while both end-diastolic (105 ± 33 cc to 88 ± 34 cc, $p < 0.0001$) and end-systolic volumes (43 ± 29 cc to 30 ± 29 cc, $p < 0.0001$) showed striking reductions with Valsalva maneuver.

Rolandi MC et al (2006) conducted a study to asses the effect of the Valsalva maneuver (VM) on cardiac-coronary interaction in humans assessed by wave intensity analysis. The valsalva maneuver provokes strong changes in cardio vascular system. In 12 patients undergoing cardiac catheterization were simultaneously recorded aortic pressure, left ventricular pressure, and intracoronary pressure (Pd) and flow velocity (U) while the patients were performing a VM. Coronary wave intensity was calculated (dI = dP*dU) at characteristic phases of the VM and related to hemodynamic parameters of left ventricular (LV) performance. During the strain, blood pressure increased transiently followed by a significant decrease (p<;;0.001) at maximum strain. Changes in mean LV pressure followed the same pattern, while LV end-diastolic pressure increased to almost 40 mmHg (p<;;0.001), with a 30% reduction in LV dP/dt (p<;;0.005). Coronary flow velocity remained fairly constant

throughout the valsalva maneuver. All hemodynamic values returned to the baseline at conclusion of the valsalva maneuver.

Bal bay et al (2001) conducted a study to assess the effectiveness of valsalva maneuver on QT depression in patient with ischemic heart disease. The study population included 85 subjects (21 with normal coronary arteries, 35 with stable angina pectoris, and 29 with unstable angina pectoris). Twelve-lead surface ECGs were recorded at 50-mm/sec paper speeds and were obtained before the Valsalva maneuver and during the strain phase. The results indicate a significant difference in mean time increase between the control group and the group with stable angina pectoris (mean difference = 16.10 milliseconds, $p<0.000$), and between the control group and the group with unstable angina pectoris (mean difference = 35.26 milliseconds, $p<0.000$). The mean difference in time between these groups was also compared (mean difference = 19.17 milliseconds), and was statistically significant ($p<0.000$). The valsalva maneuver is effective on QT depression in patient with ischemic heart disease.

Richards PT et al(2008) conducted three randomized controlled trials to asses effectiveness of valsalva maneuver for reversion of supraventricular tachycardia . Three hundred and sixteen participants included in the study . All three studies compared the effectiveness of Valsalva maneuver(VM) in reverting Supraventricular tachycardia(SVT) with that of other vagal maneuvers in a cross-over design. Two studies induced SVT within a controlled laboratory environment. Participants had ceased all medications prior to engaging in these studies. The third study reported on patients presenting to a hospital emergency department with an episode of SVT. These patients were not controlled for medications or other factors prior to intervention. The two laboratory studies demonstrated reversion rates of 45.9% and 54.3%, whilst the clinical study demonstrated reversion success of 19.4%. This discrepancy may be due to methodological differences between studies, the effect of induced SVT versus spontaneous episodic SVT, and participant factors such as medications and co morbidities. The result shows that there were no sufficient evidence to support or refute the effectiveness of the Valsalva maneuver for termination of SVT.

Teo WS et al (1999) conducted a prospective randomized case study to compare the efficacy of the Valsalva maneuver with that of carotid sinus massage

(CSM) in terminating paroxysmal supraventricular tachycardia (SVT) in the Emergency department (ED) of a tertiary care institution. Patients were at least 10 years of age with regular narrow complex tachycardia and had an ECG diagnosis of SVT. Patients with regular narrow complex tachycardia were randomly assigned to undergo either the Valsalva maneuver or CSM. If the tachycardia was not terminated by the method chosen by randomization, then the alternative method of vagal maneuver was used. If the tachycardia was not converted by both methods of vagal stimulation, patients would undergo either synchronized electrical cardio version or a pharmacologic method of conversion at the discretion of the treating physician, depending on the patient's hemodynamic status. One hundred forty-eight instances of SVT were studied Sixty-two patients underwent Valsalva maneuver first with conversion in 12 (success rate of 19.4%). Eighty-six underwent CSM first with conversion in 9 (success rate 10.5%). Carotid sinus massage was used in the 50 cases of SVT in which conversion was not achieved with the Valsalva maneuver. Conversion occurred in 7 cases (success rate 14.0%). For the 77 cases of SVT in which initial CSM did not achieve conversion, conversion occurred in 13 with the Valsalva maneuver (success rate 16.9%). The Valsalva maneuver and CSM achieved conversion in a total of 41 instances of SVT (success rate 27.7%). There is no detectable difference in efficacy between the Valsalva maneuver and CSM.

Chapter iii

METHODOLOGY

Research methodology is the way to solve problems systematically. This chapter contains the methodology and difference steps that were under taken for the collection and organization of the data by the investigator.

The methodology of the study includes research approach, Design, setting, population, sample, data collection procedure and statistical analysis of data.

Research approach

The research approach selected for this study was quantitative approach.

Research design

The research design determine how the study will be, when the data is to be collected, organized, and when interventions are to be implemented.

The design used in this study was quasi experimental with posttest only control group design.

The design can be diagrammatically represented as follow:

E	x	O_2
C	-	O_2

E – Experimental group

C – Control Group

X – Valsalva Maneuver

O_2 – Post test

Setting of the Study

The study was conducted in Sree Mookambika Medical College Hospital at Kulasekharam. It is a 600 bedded Multispecialty Hospital and also a teaching hospital for medical and nursing students. On an average 600-800 peripheral intravenous cannulations performed in a month.

Variables

Independent variable:

Valsalva Maneuver

Dependent Variable:

Pain during intravenous cannulation.

Demographic Variables:

Age, Sex, Education, Occupation, Culture, Previous experience of intravenous cannulation.

Population

Target Population:

The target population for the study was adult patients in the age group of 25-45 years undergone peripheral intravenous cannulation.

Accessible Population:

Accessible population for the study was adult patients in the age group of 25-45 years under gone peripheral intravenous cannulation and who meets the inclusion criteria.

Sample

Sample Size

Sample consist of 60 patients of both sexes in the age group of 25-45 years under gone peripheral intravenous cannulations. Among them 30 patients allotted to the experimental group and 30 allotted to the control group.

Sampling Technique

The adult patients in the age group of 25-45 years undergone peripheral intravenous cannulation who meet the inclusion criteria were selected by purposive sampling technique. They were assigned to experimental and control group .

Criteria for Sample Selection

Inclusion Criteria:

1. Adults admitted in the wards.
2. Adults underwent 20 G peripheral intravenous cannulation.
3. Adults in the age group of 25-45 Years.
4. Male and Female adults.
5. Members willing to participate in the study.

Exclusion Criteria:

1. Adult patients with severe body pain before peripheral intravenous cannulation.
2. Adult patients having critical illness (Cerebro Vascular Accident (CVA), bleeding disorders, mechanically ventilated patients, unconscious patients).

Data Collection Tool

The data collection tool used for the study was

1. Demographic variables
2. Numerical rating scale

Description of the Tool

The tool consist of two sections section A and B

Section A:

It deals with demographic variables such as age, sex, education, occupation, culture and previous experience of intravenous cannulation.

Section B:

Section B consists of numerical rating scale for pain which is use to assess the level of pain during peripheral intravenous cannulation.

The pain scale is 10 point

0	-	no pain
1-3	-	mild pain
4-6	-	moderate pain
7-10	-	Severe pain

Testing of the Tool

Validity

Validity of the tool was established on the basis of the opinion of experts. Four experts in the field of medical surgical nursing and one expert from the department of medicine.

Reliability

Reliability was not sort as the tool ie. Standardized one.

Pilot Study

Pilot study was conducted in Sree Mookambika Medical College Hospital. Six samples were selected based on the inclusion and exclusion criteria. The sample were allotted to experimental and control group by purposive sampling technique. Valsalva maneuver was used in experimental group during peripheral intravenous cannulation, where as control group was not given any intervention. Post test pain assessment done for both groups, which is measured by numerical rating scale for pain.

Data Collection Procedure

Data was collected in Sree Mookambika Medical college Hospital in the month of September 2014. Sixty samples selected by using purposive sampling technique based on inclusion and exclusion criteria. The samples was allotted to experimental and control group. valsalva maneuver is performed by blowing

forcefully into rubber tubing connected to aneroid BP apparatus and raising the needle of the dial up to 20 mm Hg for a period of 20 seconds in experimental group prior to peripheral intravenous cannulation with 20 G intravenous cannula. Where as control group was not given any intervention. Post test was conducted in experimental and control group by using numerical rating scale.

Plan for Data Analysis

Data analysis was done by using the following statistical method. Descriptive statistical method like percentage, mean and standard deviation were used to assess the level of pain during peripheral intravenous cannulation. Inferential statistical methods like “t” test and chi – square test to find out the association between variables.

The effectiveness of valsalva maneuver was analyzed by using chi square test.

Summary

This chapter described the scientific path way through which investigator proceeded for conducting the study. The setting of the study, the population, sample the tool and techniques used for the study were clearly described. It also gave account of the pilot study, data collection procedures of the actual study and plan for analysis.

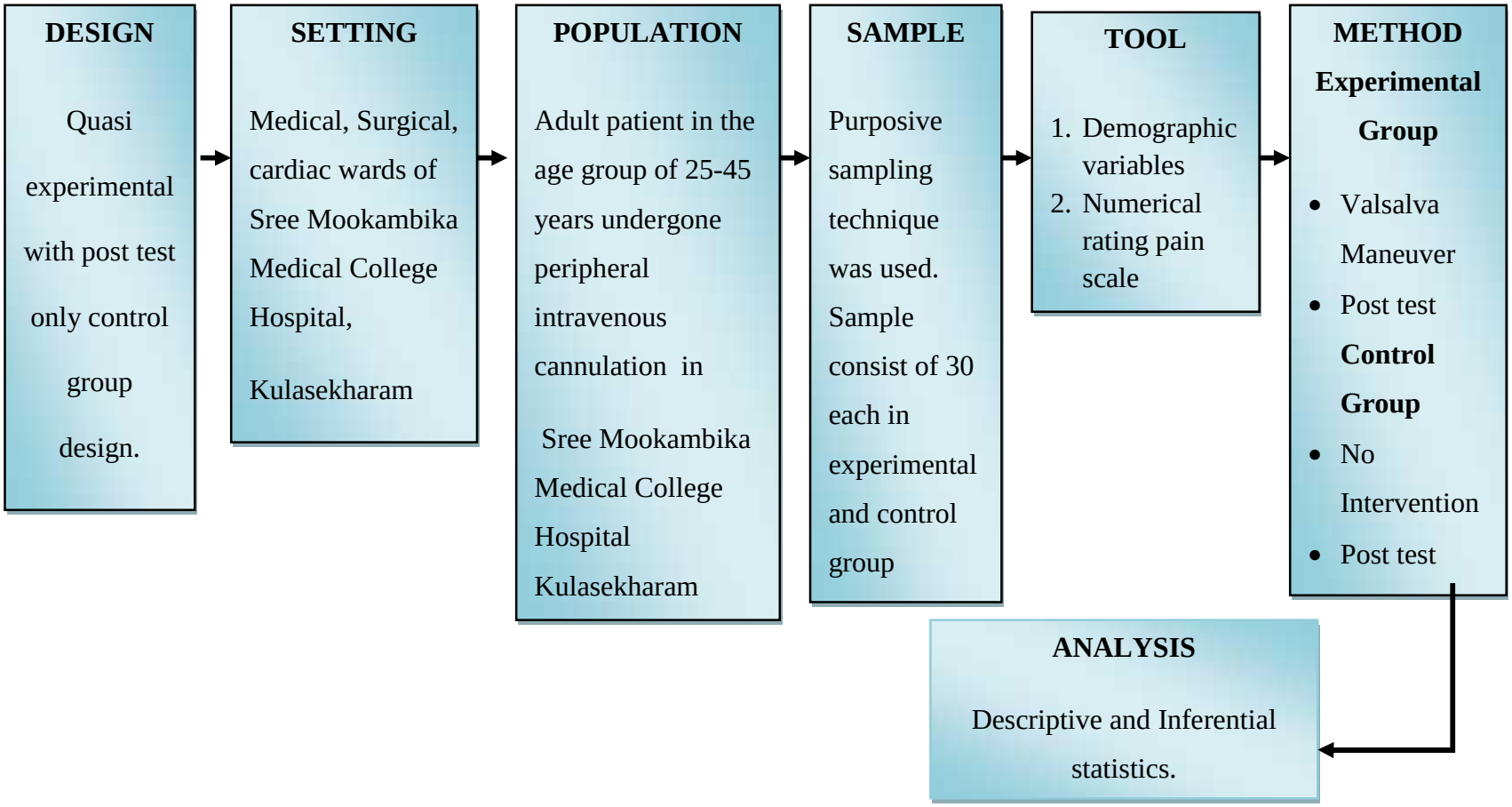


Figure 2. Schematic Representation of Research Design

Chapter iv

DATA ANALYSIS AND INTERPRETATION

Introduction

This chapter deals with the analysis and interpretation of data collected in accordance with the objectives stated for the study. The data collected were analyzed by using descriptive and inferential statistics. The test score was analyzed by statistical mean and standard deviation. The significance difference of mean scores were interpreted by 't' test.

The difference in experimental and control group was assessed by 't' test. The association between demographic variables and level of pain was studied by chi – square test.

Objective of the Study

1. To assess the effect of valsalva maneuver on reducing pain during peripheral intravenous cannulation by comparing with control group.
2. To find out the association between level of pain and selected demographic variables like age, sex, education, occupation, culture and previous experience of intravenous cannulation pain.

Presentation of Data

The data collected was tabulated and presented as follows:

Section A

This section displays the demographic variables of the subjects selected by the investigator. Frequency and percentage distribution according to the level of pain.

Section B

This section deals with

1. Comparison of mean score of peripheral intravenous cannulation pain between the experimental group and control group.

2. Effectiveness of Valsalva Maneuver in reducing pain during peripheral intravenous cannulation.

Section C

This section deals with association between level of pain and the selected demographic variables.

SECTION A

This section deals with the demographic variables of the subjects selected by the investigator.

Table 1.

Percentage Distribution of Study Subject According to Demographic Variables in Experimental and Control group(N = 30).

Demographic variables	Experimental group (n=30)		Control group (n=30)	
	f	%	f	%
Age(in years)				
25-30	7	23.3%	10	33.3%
31-35	4	13.3%	2	6.6%
36-40	9	30%	7	23.3%
41-45	10	33.3%	11	36.6%
Sex				
Male	14	46.6%	16	53.3%
Female	16	53.3%	14	46.6%

Table 1 Contd……

Education				
Illiterate	6	20%	6	20%
Primary	12	40%	11	36.6%
Secondary	7	23.3%	11	36.6%
Graduate	5	16.6%	2	6.6%
Occupation				
Sedentary worker	5	16.6%	3	10%
Heavy worker	12	40%	13	43.3%
House wife	13	43.3%	14	46.6%
Culture				
Urban	5	16.6%	4	13.3%
Rural	25	83.3%	26	86.6%
Previous experience of intravenous cannulation				
Present	29	96.6%	27	90%
Absent	1	3.3%	3	10%

The above table describes the distribution in number and percentage of study subjects according to their demographic variables, 30% participants in the age group of 41 – 45 years.

Fifty percentage participants were female and 38.3% of samples were house wife and 85% samples from rural culture. While consider previous experience of peripheral intravenous cannulation 93.3% of samples have previous experience of peripheral intravenous cannulation.

The above finding are presented as figure:

1. Distribution of Demographic variables according to age in the experimental group presented as bar diagram in figure3.
2. Distribution of demographic variables according to age in the control group presented as bar diagram in figure 4.
3. Distribution of demographic variables according to sex presented as bar diagram in figure 5.
4. Distribution of demographic variables according to education in the experimental group presented as bar diagram figure 6.
5. Distribution of demographic variables according to education in the control group presented as bar diagram in figure 7.
6. Distribution of demographic variables according to occupation in the experimental group presented as bar diagram in figure 8.
7. Distribution of demographic variables according to occupation in the control group presented as bar diagram in figure 9.
8. Distribution of demographic variables according to culture presented as bar diagram in figure 10.
9. Distribution of demographic variables according to previous experience of peripheral intravenous cannulation presented as bar diagram in figure 11.

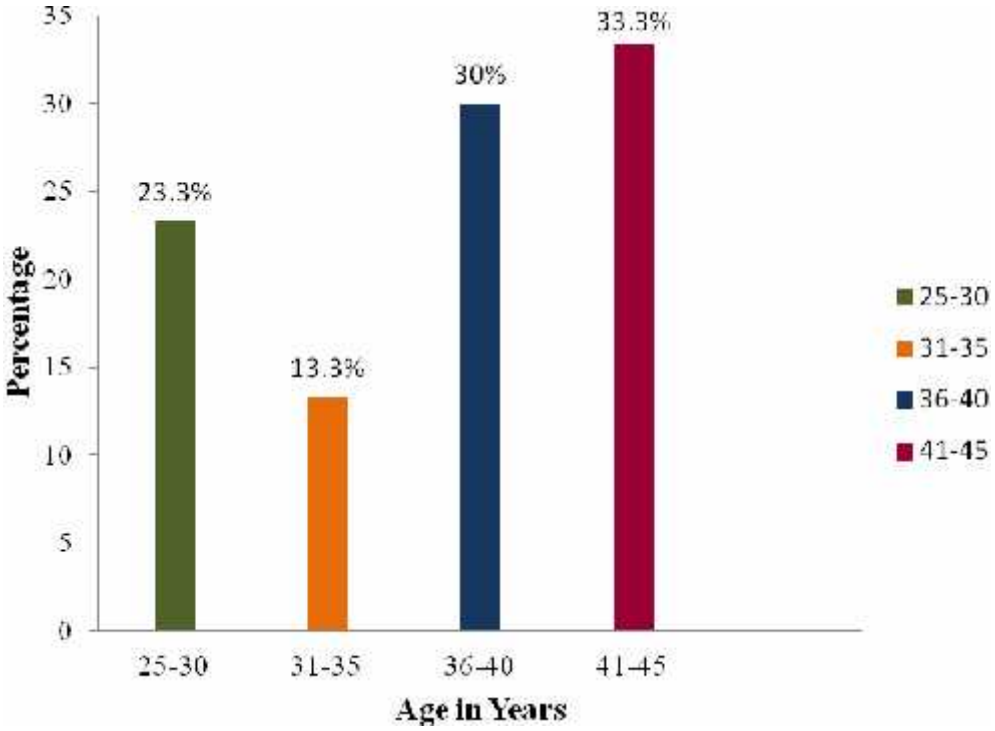


Figure 3. Distribution of Demographic Variables According to Age in Experimental Group

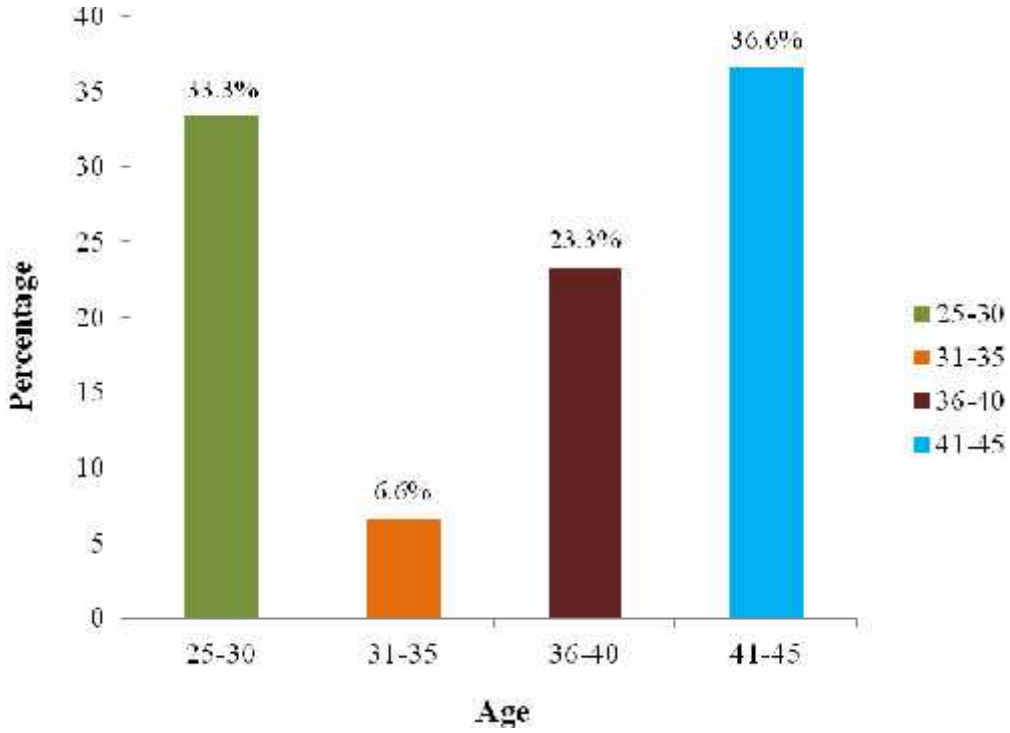


Figure4. Distribution of Demographic Variables According to Age in Control Group

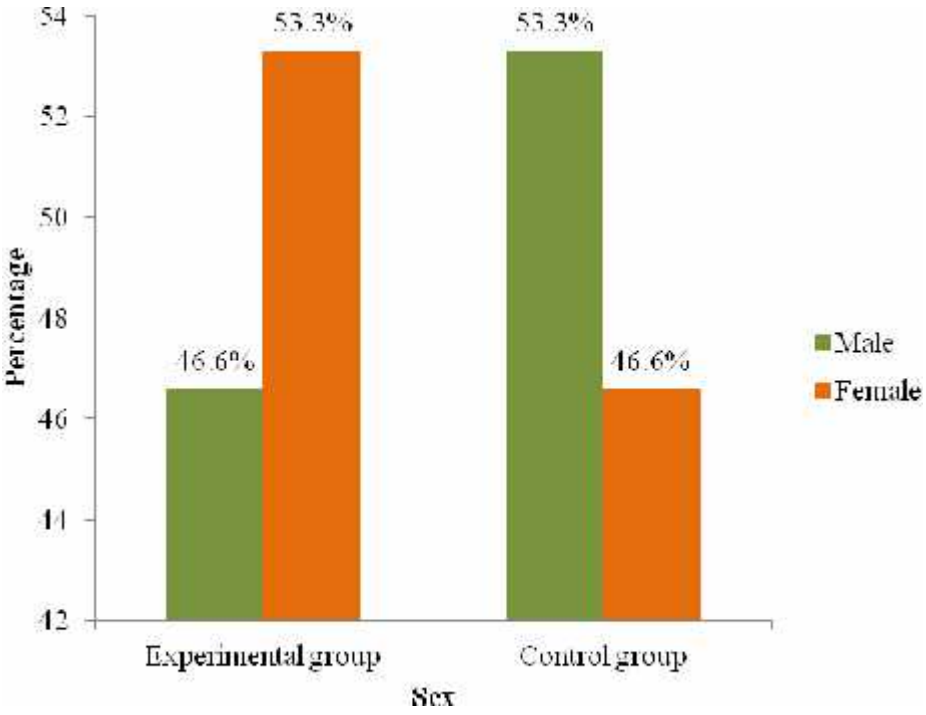


Figure5. Distribution of Demographic Variables According to Sex

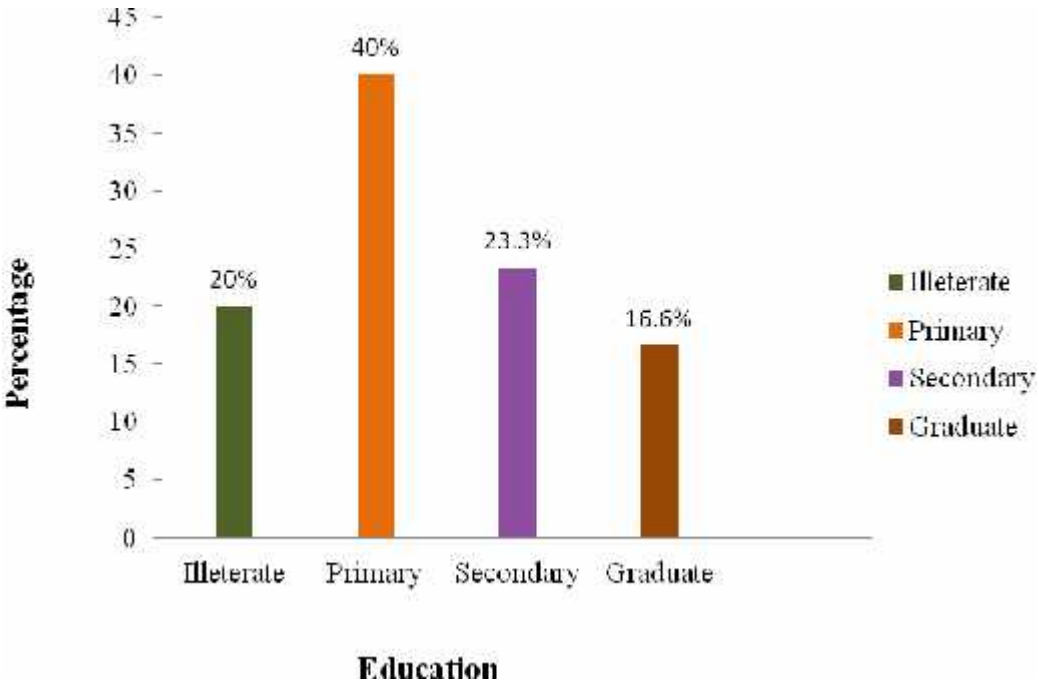


Figure 6. Distribution of Demographic Variables According to Education in Experimental Group

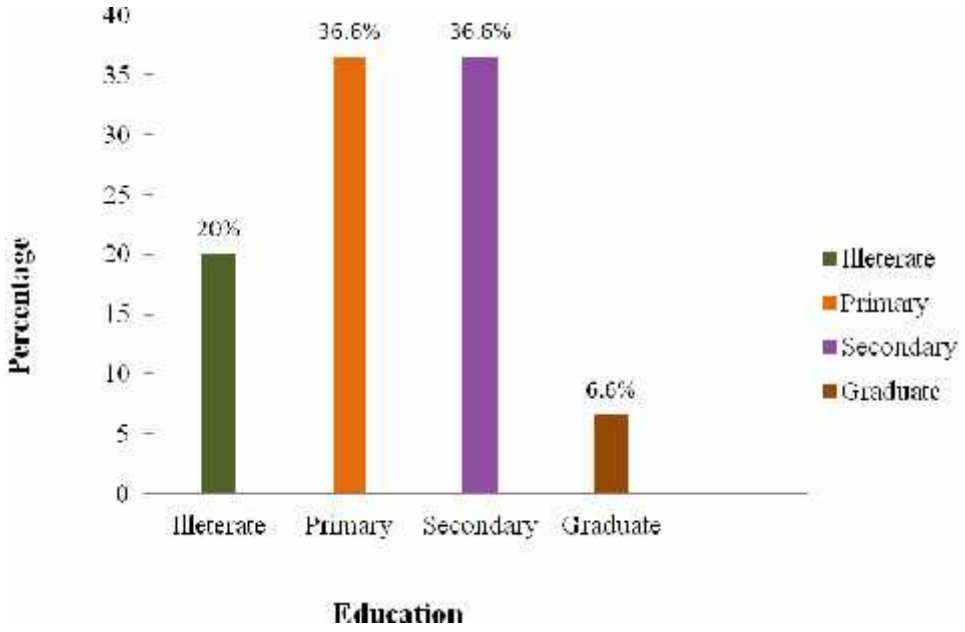
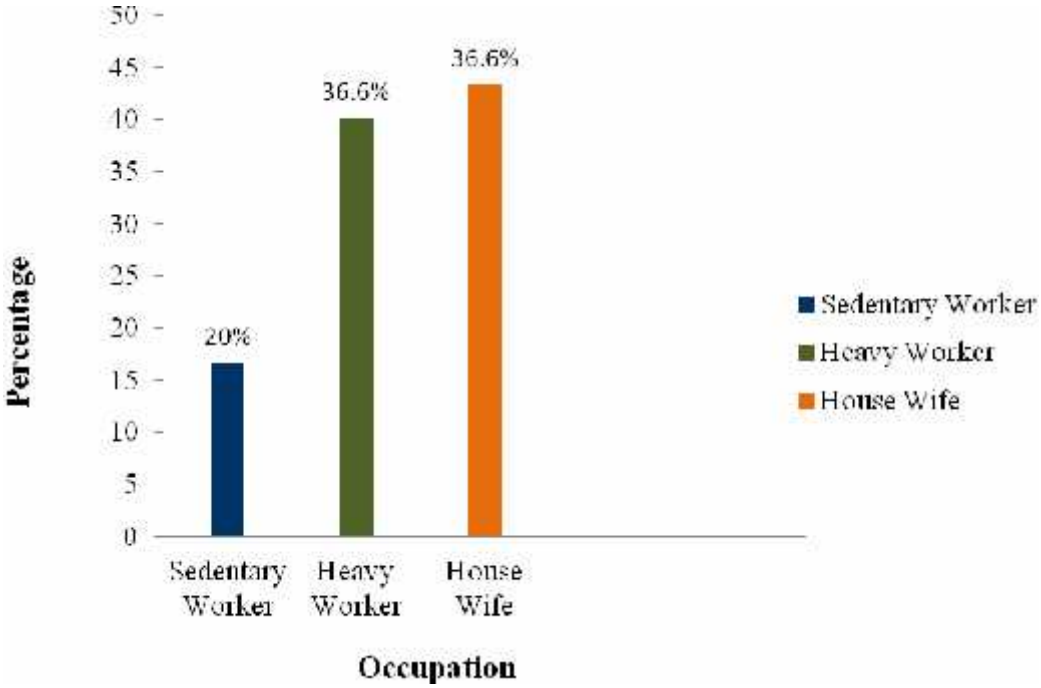


Figure7. Distribution of Demographic Variables According to Education in Control Group



<u>Figure8.</u> Distribution of Demographic Varaibles According to Occupation in Experimental Group

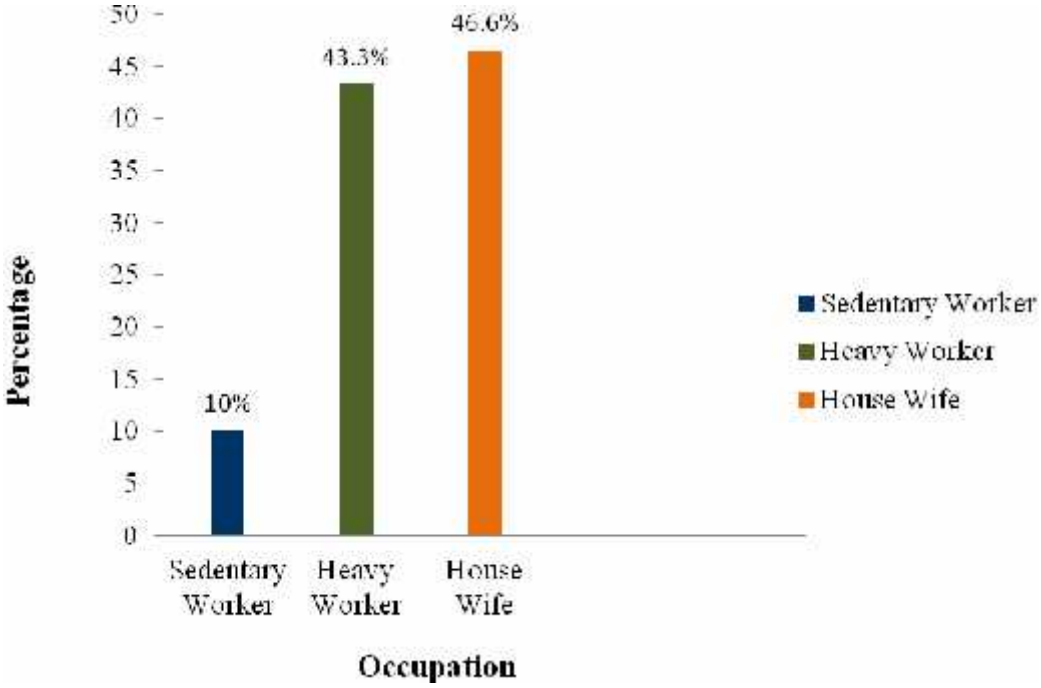


Figure9. Distribution of Demographic Varaibles According to Occupation in Control Group

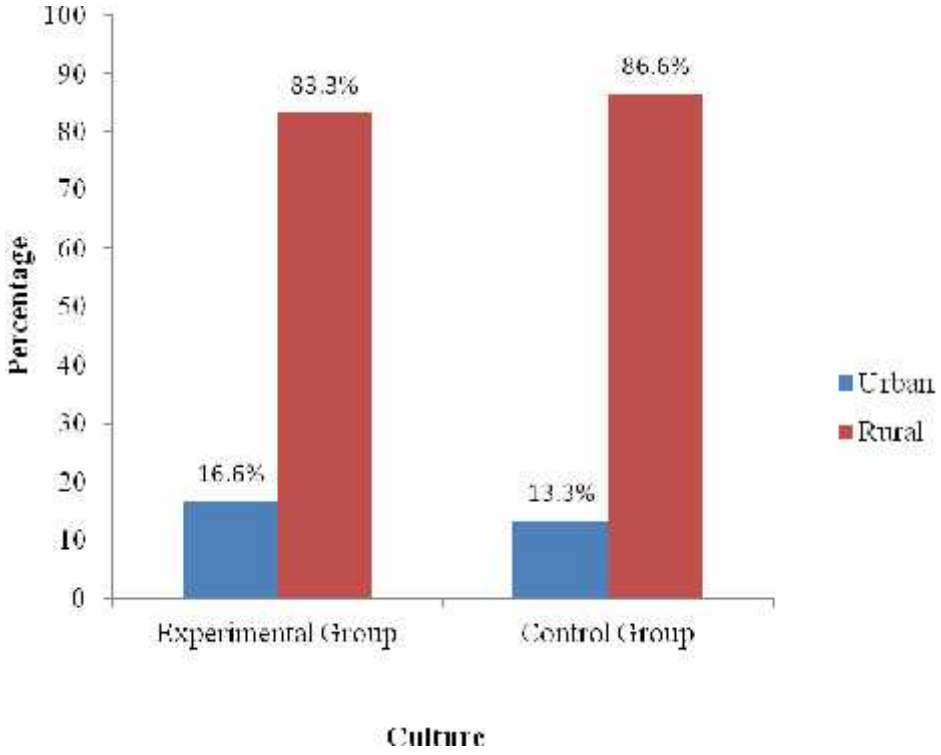


Figure10. Distribution of Demographic Variables According to Culture

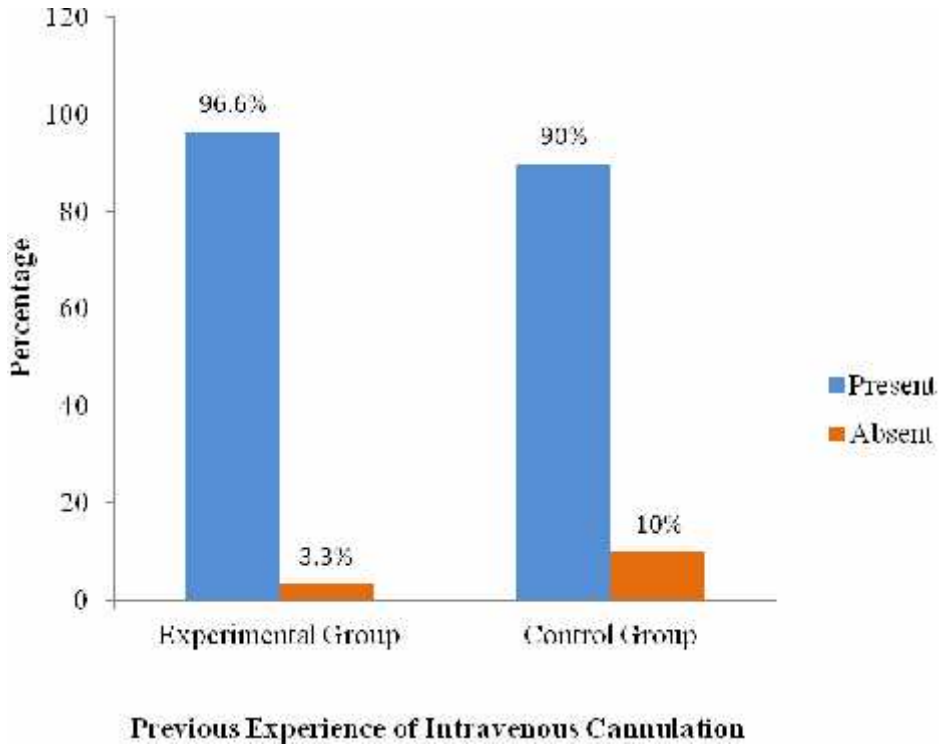


Figure11. Distribution of Demographic Variables According to Previous Experience of Peripheral Intravenous Cannulation

Table2.

Frequency and Percentage Distribution According to the Level of Pain

(N=60).

Pain score	Experimental group		Control group	
	Post test		Post test	
	F	%	f	%
No Pain	0	0%	0	0%
Mild pain	25	83.3%	0	0%
Moderate pain	5	16.6%	13	43.3%
Severe/worst pain	0	0%	17	56.6%

The above table shows the frequency and percentage distribution of sample according to the level of pain.

In the post test in the experimental group 83.3% samples experience mild pain and 16.6% samples experience moderate pain. In the control group 43.3 % samples experience moderate pain and 56.6% samples were experience severe pain.

The presence of above findings are presented figure 12 and 13

1. Frequency and percentage distribution of sample according to the level of pain in the experimental group represented as bar chart in figure 12.
2. Frequency and percentage distribution of sample according to the level of pain in control group represented as bar chart in figure 13.

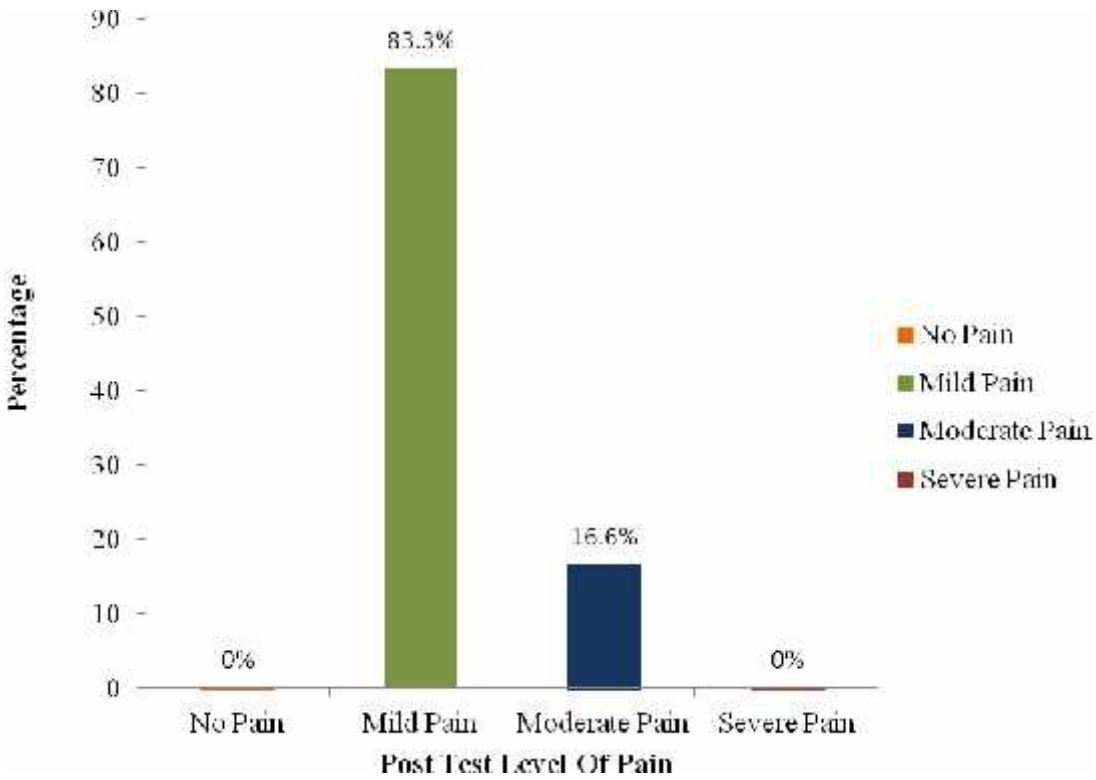


Figure12. Frequency and Percentage Distribution of Sample According to the Level of Pain in Experimental group

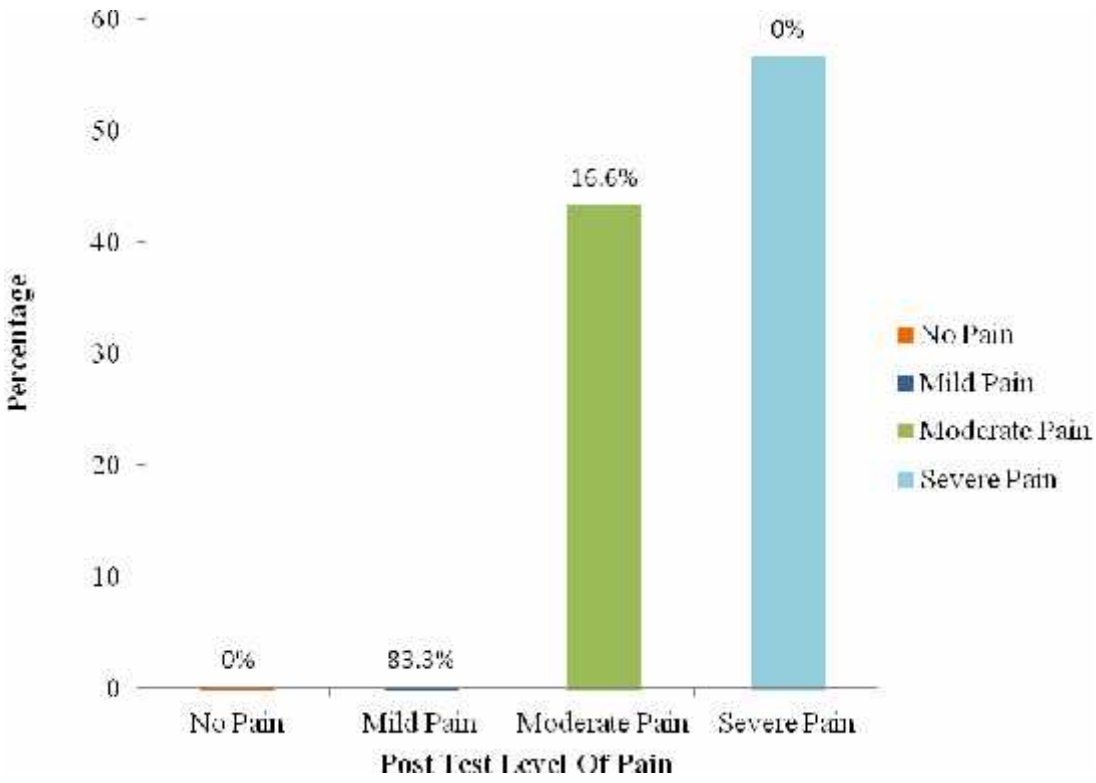


Figure13: Frequency and Percentage Distribution of Sample According to the Level of Pain in Control Group

SECTION B

Table 3.

Comparison of Mean Score of Peripheral Intravenous Cannulation Pain Between Experimental Group and Control Group (N=60).

	ExperimentalGroup	Control Group	
Variable	M	M	MD
Intravenous Cannulation Pain	2.63	6.97	4.34

The table 3 shows the mean pain score of experimental group 2.63. Whereas the mean pain score of control was 6.97. The mean difference of intravenous cannulation pain score of experimental group and control group was 4.34. This indicates that the mean pain score of experimental group was lower than the mean pain score of control group.

The above findings presented as figure 14.

1. Comparison of Mean Score of Peripheral Intravenous Cannulation Pain Between Experimental Group and Control Group Presented as bar diagram in figure 14.

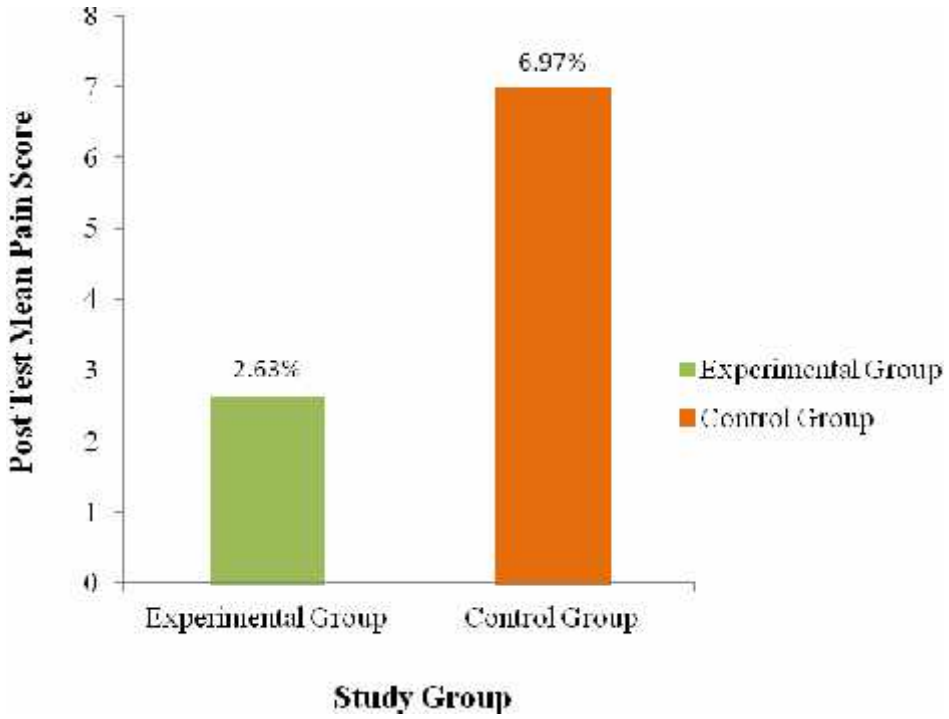


Figure 14. Comparison of Mean Score of Peripheral Intravenous Cannulation Pain Between Experimental Group and Control Group.

Table 4.

Effectiveness of Valsalva Maneuver in reducing pain during peripheral intravenous cannulation (N=60).

Group	N	M	MD	SD	t
Experimental	30	2.63	4.34	1.133	*14.8
Control	30	6.97		1.45	

*Significant at $p<0.05$

The data presented in table 4 shows that the mean difference of peripheral intravenous cannulation pain score 4.34 between the mean post test scores of control and experimental group was significant at $p<0.05$ level as the value $t = 14.8^*$ at $df = 58$, $p<0.05$.Hence the research hypothesis(H1) was accepted .This indicate that the difference of mean observed was a true difference. The above findings shows that the Valsalva Maneuver had a significant effect in reducing the level of peripheral intravenous cannulation pain of adult patients.

The above findings are presented as figure:

1. Effectiveness of Valsalva Maneuver in reducing pain during peripheral intravenous cannulation presented as bar diagram figure 15.

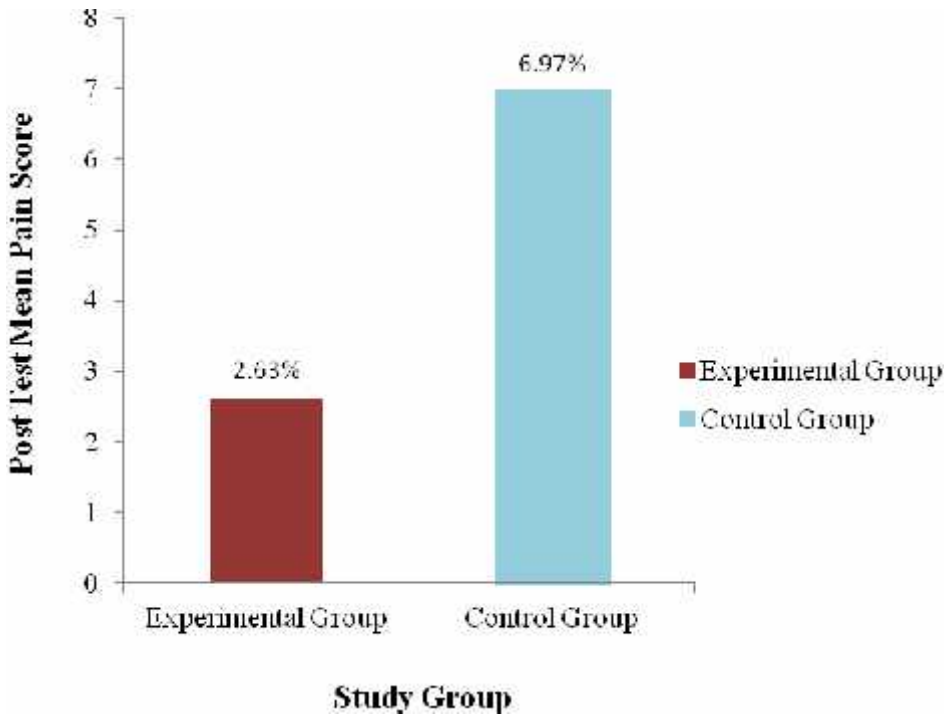


Figure15. Effectiveness of Valsalva Maneuver in Reducing Pain During Peripheral Intravenous Cannulation.

SECTION C

Table5

Association between the level of peripheral intravenous cannulation pain and selected demographic variables.

Demographic variables	N	Above Mean	Below Mean
Age			
25 - 30	17	10	7
31 - 35	6	3	3
36 - 40	16	7	9
41 – 45	21	12	9
	$\chi^{2=}$ = 0.152,	df=3	tablevalue=7.82
Sex			
Male	30	14	16
Female	30	16	14
	$\chi^{2=}$= 0.267	df =1	tablevalue=3.84
Education			
Illiterate	12	7	5
Primary	23	11	12
Secondary	18	10	8
Graduate	7	2	5
	$\chi^{2=}$ =0.069	df =3	tablevalue=7.82

Table contd……..

Occupation			
Sedentary worker	8	2	6
Heavy worker	25	12	13
House wife	27	16	11
	χ^2=1.68	df=2	tablevalue=5.99
Culture			
Urban	9	4	5
Rural	51	26	25
	χ^2=0.131	df=1	tablevalue=3.84
Previous experience of intravenous cannulation			
Present	56	27	29
Absent	4	3	1
	χ^2=1.071	df=1	Tablevalue=3.84

The above table 5 describes the association between the level of pain with demographic variables both in experimental and control groups. The results shows there is no association between the level of pain and selected demographic variables such as age, sex, education, occupation, culture and previous experience of intravenous cannulation. So the research hypothesis (H2) was rejected.

Chapter v

RESULTS AND DISCUSSION

The present study was undertaken to assess the effectiveness of Valsalva Maneuver on pain reduction among adult patients undergoing peripheral intravenous cannulation in Sree Mookambika Medical College Hospital, Kulasekharam. Design adopted for the study was Quasi experimental with post test only control group design. The level of pain during peripheral intravenous cannulation was assessed by numerical rating pain scale. The result and discussion of the study are based on the findings obtained from the statistical analysis.

Objectives of the study

1. To assess the effect of Valsalva maneuver on reducing pain during peripheral intravenous cannulation by comparing with control group.
2. To find out the association between level of pain and selected demographic variables like age, sex, education, occupation, culture and previous experience of intravenous cannulation.

Distribution of selected characteristics of the study subjects

The demographic variables of experimental and control group were matched in theirage, sex, education, occupation, culture, previous experience of intravenouscannulation.

The table 1describes the distribution in number and percentage of the study subjects according to their demographic variables.

The percentage distribution based on the previous experience of cannulation reveals that 93.3% of the subjects having the previous experience of intravenous cannulation , 59% of the samples were females 30% participants in the age group of 41-45 yrs. Among the total sample 38.3% of the subjects were having primary education while considering the occupation 45% were house wife 85% samples were from rural culture. From the above sample, it is observed that the experimental and control group were matched in their age, sex, education, occupation, culture and previous experience of intravenous cannulation.

The table2 shows the frequency and distribution of sample according to the level of pain. Experimental group 83.3% samples experiences mild pain and 16.6% samples experience moderate pain in the post test. In the control group 43.3% samples experience moderate pain and 56.6% samples experienced severee pain in the post test.

The study findings of the 60 samples were discussed based on the objectives of the study.

To first objective of the study was to assess the effect of Valsalva Maneuver on reducing pain during peripheral intravenous cannulation by comparing with control group. Table5 shows effectiveness of Valsalva Maneuver in reducing pain during intravenous cannulation in experimental and control group. The post test mean of experimental group was 2.63 and control group 6.97, table 4 shows comparison of mean in experimental group after Valsalva Maneuver with control group. In experimental group the Mean +/-S.D pain was 2.63 +/- 1.133 and in control group it was 6.97+/- 1.45. The mean pain score in the experimental group during cannulation was significantly less than that of control group ($t=14.8^{*}$, df=58 and $P<0.05$).So the research hypothesis(H1) was accepted.

The study finding is congruent with study conducted by vijay VR et al (2013) regarding the effectiveness of valsalva maneuver on pain reducing during intravenous cannulation. The results shows in the interventional group the pain during intravenous cannulation (mean +/-SD, 2.98+/-1.75) significantly less than that of control group (mean +/-SD, 4.7+/-1.75) t=5.31, df=98, $P<0.01$.

The study findings is also congruent with study conducted by Basaranoglu et al (2006) to evaluate the effect of valsalva maneuver on reducing pain during intravenous cannulation. Among 110 patients scheduled for elective surgery. Half of them under went venepuncture during a valsalva maneuver group A and other half under went venepuncture with out performing valsalva meanuver in group B. the numerical rating scale score was 1.5+/-1,2 for group A and 3.1+/-1.9 for group B. the difference being statistically significant $P<0.0001$.

The study findings is also congruent with study conducted by Agarwal A et al (2005) regarding the effectiveness of Valsalva Maneuver on venous cannulation pain. The results shows that the significant reduction in the incidence of pain was observed

in the Valsalva group: 18 of 25 (72%) patients, whereas 25 of 25 (100%) experienced pain in the other two groups ($P < 0.001$). A significant reduction in the severity of pain, number of patients in whom one needed to make the vein prominent before cannulation, and the time taken for the same were observed in the Valsalva group ($P < 0.001$). Valsalva Maneuver is an effective method to reduce pain during intravenous cannulation.

The second objective of the study was to find out the association between level of pain and selected demographic variables (age, sex, education, occupation cultures, previous experience of intravenous cannulation)

The table 5 describes the association between the level of pain and selected demographic variables in both experimental and control group. The table clearly shows that there is no association between the level of pain and selected demographic variables. So the research hypothesis (H2) was rejected.

Chapter vi

SUMMARY, CONCLUSION, NURSING IMPLICATION, LIMITATION AND RECOMMENDATIONS

Summary of the Study

The study was undertaken assess the effect of Valsalva Maneuver in reducing pain during peripheral intravenous cannulation among adult patients admitted in Sree Mookambika Medical College Hospital, Kulasekharam.

Objective of the Study

1. To assess the effect of Valsalva Maneuver on reducing pain during peripheral intravenous cannulation by comparing with control group.
2. To find out the association between the level of pain and selected demographic variables like age, sex, education, occupation, culture and previous experience of intravenous cannulation

Hypotheses

1. There is a significant reduction in the level of pain during peripheral intravenous cannulation in the experimental group than in the control group.
2. There is a significant association between the level of pain with selected demographic variables such as age, sex, education, occupation, culture and previous experience of intravenous cannulation.

The researcher adopted a quantitative approach with post-test only control group design. The study was done on 60 patients undergone intravenous cannulation admitted in the medical, surgical, cardiac wards in Sree Mookambika Medical College Hospital. In this study, the independent variable is Valsalva maneuver and dependent variable is paint during peripheral intravenous cannulation. The subjects were selected by purposive sampling techniques and data were collected from the two groups of patients,30 were allotted in the experimental group and 30 in the control group.

The tool used for the study was numerical rating pain scale. Valsalva Maneuver was given to the experimental group and control group was not given any intervention. Post-test was conducted to the experimental and control group. The collected data were analyzed based on descriptive and inferential statistics according to the above mentioned objectives.

The study identifies that the level of pain was reduced in the experimental group while comparing with control group. It was found that there was a significantly high reduction in the level of pain of experimental group after Valsalva maneuver than in the control group. The t-Value of effectiveness of pain reduction during peripheral intravenous cannulation tabulated was found to be $t = 14.8^{*}$, $df = 58$, $p < 0.05$.

Study Findings

The study identified that the level of pain was reduced in experimental group. It was found that there was a significant reduction in the level of peripheral intravenous cannulation pain of experimental group after Valsalva Maneuver than in the control group. The t value of effectiveness of pain reduction during peripheral intravenous cannulation tabulated was found to be $t = 14.8^{*}$, $df = 58$, $p < 0.05$.

Conclusion

The conclusion drawn from the findings of the study are as follows:-

1. Valsalva Maneuver found to be an effective nursing intervention in reducing pain among adult patients during peripheral intravenous cannulation
2. Valsalva Maneuver found have no side effects when comparing with other pharmacological treatment.
3. Patient satisfaction is very much higher in this intervention.
4. The findings of the study enlighten the fact that Valsalva Maneuver can be used as a cost effective nursing intervention in reducing the pain during peripheral intravenous cannulation.

Nursing Implications

Most clients are afraid of peripheral intravenous cannulation pain. The anxious patients may avoid or postponed needed medical care.

Research indicates that Valsalva Maneuver reduce the pain intensity during peripheral intravenous cannulation, accelerate the rate of decline of the unpleasantness and increase the feeling of wellbeing.

There for the findings of the study has considerable implications on nursing administration, nursing education, nursing practice, nursing research.

Implications to Nursing Administration:

1. Nurse administrator can take steps to conduct training classes regarding proper practice of Valsalva Maneuver prior to intravenous cannulation.
2. Nurse administrator can take steps to change the hospital policy so that the Valsalva Maneuver can be inculcated into routine peripheral intravenous cannulation procedure.
3. The nurse administrator can act as a change agent in utilizing the research findings.
4. The study helps the nurse administrator to assess the knowledge of nurses regarding non pharmacological measures of pain reduction.

Implications to Nursing education:

1. Nurse educator can train and encourage the student nurse to implement Valsalva Maneuver as a pain reducing measure.
2. This study can motivate student nurse to explore new strategies for effective reduction of pain during peripheral intravenous cannulation.
3. This research report can kept in library for reference of nursing personnel and other healthcare professionals.
4. The nurse educator can present the details of Valsalva Maneuver in curriculum meetings and include this maneuver in the curriculum as a non pharmacological measure to reduce pain during peripheral intravenous cannulation.

Implication to Nursing practice:

1. Valsalva Maneuver is a safe and better non pharmacological modality which brings a higher level of satisfaction for patients.
2. The nurse can take Valsalva Maneuver as a research evidence and should practice in their daily nursing care.
3. The nurse practitioners can take independent decisions based on principles of healthcare.

Implications to Nursing research:

The nurse research implications of the study lies in the scope for expanding the quality of nursing service. In this era of evidence based practice, publication of these study will take nursing to a new horizon.

1. Nurse researcher can do various studies related to effectiveness of Valsalva Maneuver on pain reduction.
2. The nurse researchers can conduct other research studies based on the research evidence from this study.
3. The nurse researcher can conduct studies to find out the knowledge and practice of Valsalva Maneuver among staff nurses.
4. A comparative study can be done to determine the effectiveness of Valsalva Maneuver with other non pharmacological measures
5. Similar study can be conducted on large sample so it could be generalized.

Limitations

1. The sample size of patient for the experimental and control group was only 30 and hence generalizations not possible.
2. The data collection period was only one month.
3. The study is limited only to the patients admitted in Sree Mookambika Medical College Hospital during the period of data collection.
4. Extraneous variables are controlled to some extant only.

Recommendations

1. The study may be replicated with randomization in selection of a larger sample.
2. Nurse researcher can do studies related to Valsalva Maneuver on reducing other procedural pain.
3. Studies can be done to determine the other therapeutic benefits of Valsalva Maneuver.
4. A study can be conducted by including more number of variables.
5. Nurse researcher can do studies related to effect of Valsalva Maneuver to improve quality of care.

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APPENDIX A

Letter Seeking Expert Opinion for Tool Validity

SREE MOOKAMBIKA COLLEGE OF NURSING

PADANILAM WELFARE TRUST, V.P.M.HOSPITAL COMPLEX, PADANILAM,
KULASEKHARAM, K.K.DIST., TAMIL NADU, PIN : 629 161.
Phone : 04651 - 280745, 280742, 278250
(Approved by Govt. of The Tamil Nadu & Recognised by Indian Nursing Council, New Delhi)

Date :

Lr. No :

LETTER SEEKING EXPERT OPINION FOR TOOL VALIDITY

Date :

To

Madam / Sir

Sub : M.Sc Nursing Programme – dissertation – Validation of study tool request –reg:

Ms/Mrs. **ANJANA.T.D** a bonafide if II Year M.Sc Nursing student of Sree Mookambika College of Nursing is approaching you to obtain validation of study tool pertaining to her dissertation in practical fulfillment of the requirement for the degree of Master of Science in Nursing. **A study to assess the effectiveness of valsalva maneuver of pain reduction among adult patients undergoing venous cannulation in Sree Mookambika Medical College Hospital at Kulasekharam**. In this regard I request you to kindly extent possible technical guidance and support for successful completion of dissertation.

I enclosed here with a check list for your evaluation.

Thanking You

Yours Sincerely

PRINCIPAL

PRINCIPAL
Sree Mookambika College of N
Kulasekharam-629 161

APPENDIX B

Ethical Clearance Certificate

SREE MOOKAMBIKA COLLEGE OF NURSING

PADANILAM WELFARE TRUST, V.P.M.HOSPITAL COMPLEX, PADANILAM,
KULASEKHARAM, K.K.DIST., TAMIL NADU, PIN : 629 161.
Phone : 04651 - 280745, 280742, 278250
(Approved by Govt. of The Tamil Nadu & Recognised by Indian Nursing Council, New Delhi)

Date :

Lr. No :

ETHICAL COMMITTEE

To

Date:11-1-2014

Ms. Anjana.T.D

I yrM.Sc(N),

Sree Mookambika College of Nursing,

Kulasekharam.

Ref: Research Topic: A study to assess the effectiveness of Valsalva Maneuver on pain reduction among adult patients undergoing peripheral intravenous cannulation in SreeMookambikaMedical College Hospital, Kulasekharam.

Sub: Approval of the above reference study and its related documents

Dear Anjana.T.D

Ethics committee of Sree Mookambika College of Nursing, Kulasekharam reviewed and discussed the study proposal documents submitted by you related to the conduct of the above referenced study and its meeting held on 11-1-2014.

The Following ethical committee members were present at the meeting held on 11-1-2014.

NAME	PROFESSION	POSITION IN THE COMMITTEE
Prof. Mrs. Santhi Letha	Nursing	Chair Person
Dr. Kani Raj Peter	Medical	Basic Medical Scientist
Dr. T.C. Suguna	Nursing	Clinicians
Adv. Mohanan	Legal	Legal Expert
Prof.Mrs. AjithaRethinam	Nursing	Member Secretary
Dr. A. Selva Raj	Management	Philosopher
Mr. Natarajan	Social	Medical Social Worker
Mrs. Latha	Lay Person	Community Person

After due ethical and scientific consideration, the Ethics committee has approved the above presentation submitted by you.

Regards,

Mrs. SANTHI LETHA PhD(N)

Ethics committee- Chairperson,

Sree Mookambika College of Nursing,

V.P.M. Hospital Complex,

Kulasekharam.

Date: 11-1-2014

Place: Kulasekharam

APPENDIX C

List of Experts for Tool Validation

Dr. Kaniraj Peter M.D
Professor, HOD Dept of Medicine
SMIMS Kulasekharam, Kanyakumari.

Mrs. Amuthu MSc(N),
Vice Principal
Dept. Medical Surgical Nursing
P.S College of Nursing
Thalakkulam, Kanyakumari.

Dr.Mrs. Sharmila MSc(N), PhD(N)
Professor(Dept. Medical Surgical Nursing)
CSI College of Nursing
Neyyoor, Kanyakumari.

Mr. Joseph Merlin MSc(N),
Professor(Dept. Medical Surgical Nursing)
Saraswathy College of Nursing
Parasala, Thiruvananthapuram.

Mrs.Sheeba MSc(N),
Professor(Dept. Medical Surgical Nursing)
CSI College of Nursing
Neyyoor, Kanyakumari.

APPENDIX D

Data Collection Tool

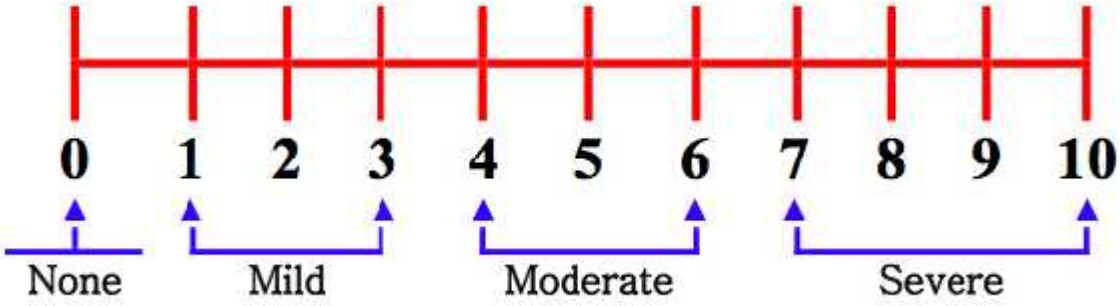
SECTION A

Demographic Variables

1. **Age**
    a. 25 - 30
    b. 31 - 35
    c. 36 - 40
    d. 41 – 45
2. **Sex**
    a. Male
    b. Female
3. **Education**
    a. Illiterate
    b. Primary
    c. Secondary
    d. Graduate
4. **Occupation**
    a. Sedentary worker
    b. Heavy worker
    c. House wife
5. **Culture**
    a. Urban
    b. Rural
6. **Previous experience of intravenous cannulation**
    a. Present
    b. Absent

SECTION : B

NUMERICAL RATING SCALE (NRS)



Scoring:

0 - No Pain

1-3 - Mild Pain

4-6 - Moderate Pain

7-10 - Severe Pain

APPENDIX E

Evaluation Criteria Check List for Tool Validation

Name of the expert :

Designation :

College :

Respected Madam / Sir,

Kindly go through the content and place the right (√) marks against the check list in the following columns ranking from relevant to non-relevant. Where ever there is a need for modification, kindly give your opinion in the remarks column.

SECTION A

DEMOGRAPHIC VARIABLES

Item No.	Relevant	Needs Modification	Not Relevant	Remarks
1				
2				
3				
4				
5				
6				

APPENDIX F

Data Collection Procedure

Steps of Procedure:

1. Self introduction and initiation of therapeutic relationship with patient.

2. Explained and demonstrated valsalva Maneuver to the patient.

3. Instructed the patient to lie in supine position and the tourniquet was applied over the fore arm.

4. Instructed to blow into a rubber tubing connected to an aneroid BP apparatus and rise the needle upto 20 mmHg for a period of 20 seconds.

5. Twenty seconds later peripheral intravenous cannulation was performed using 20 G intravenous cannula.

6. Pain during peripheral intravenous cannulation was assessed immedietly after peripheral intravenous cannulation using numerical rating scale.